

Application Serial No.: 10/004,363  
Amendment and Response to January 2, 2008 Final Office Action

## REMARKS

Claims 1, 2, 3, 5, 7 through 18, and 20 through 23 are in the application. Claims 1, 12, 13 and 17, the independent claims herein, have each been amended. Support for the above amendments is located at least at page 19, lines 9-10 and page 20, lines 28-29 of the originally-filed specification. Reconsideration and further examination are respectfully requested.

### Double Patenting Rejections

Claims 1 through 3, 5 through 18 and 20 through 29 were rejected for obviousness-type double patenting over the claims of U.S. Patent No. 6,535,574 and over the claims of U.S. Patent Application Serial No. 10/051,088. Applicants remain intent on filing Terminal Disclaimers to obviate the rejections once the present application is otherwise deemed to be in condition for allowance.

### Subject Matter Rejection

Claims 1-3, 8 and 9 were rejected under 35 U.S.C. §101 as allegedly reciting non-statutory subject matter. This rejection is respectfully traversed.

Applicants have again reviewed the Interim Guidelines mentioned in the Office Action and do not find support for the broad principles set forth in the Office Action. Specifically, the Office Action alleges “the mere manipulation of image data is considered to be a collection of steps for transmitting and receiving electromagnetic signals, which are deemed to be a judicial exception as set forth in the aforementioned guidelines”.

Nowhere do the Guidelines indicate that “the mere manipulation of image data is considered to be a collection of steps for transmitting and receiving electromagnetic signals”. Rather, the Guidelines mention “electromagnetic signals” only in the context of electromagnetic carrier signals which record functional or non-functional descriptive material. Also, the Guidelines do not include any language from which one may conclude that “transmitting and receiving electromagnetic signals ... are deemed to be a judicial exception”.

Instead, Section IV. of the Guidelines clearly sets forth a test for determining whether a claimed invention complies with the subject matter eligibility requirement of §101. First, the

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Examiner is to "determine whether the claimed invention falls within an enumerated statutory category". (Interim Guidelines, Sec. IV. B.) These categories include process, machine, manufacture, or composition of matter. In the present case, Claims 1-3, 8 and 9 clearly recite a process.

Next, the Examiner is to "determine whether the claimed invention falls within §101 judicial exceptions - laws of nature, natural phenomena and abstract ideas". (Interim Guidelines, Sec. IV. C.) Even if the claimed invention is deemed to fall within a §101 judicial exception, the invention is statutory if it is a practical application of a law of nature, natural phenomena or abstract ideas. (Interim Guidelines, Sec. IV. C. 2.) As stated in the previous response, the invention of Claims 1-3, 8 and 9 cannot reasonably be considered an abstract idea, a law of nature, or a natural phenomenon. Even if such a conclusion could be reached, Claims 1-3, 8 and 9 clearly involve a practical application and produce a tangible result (i.e., evaluating a position of a patient at a radiation treatment station). Applicants therefore submit that Claims 1-3, 8 and 9 constitute statutory subject matter. Withdrawal of the rejection under §101 is respectfully requested.

#### Prior Art Rejections

Claims 1 through 3, 5, 7, 9-14, 16-18 and 20-23 were rejected under 35 U.S.C. §102 as allegedly anticipated by U.S. Patent No. 6,405,072 to Cosman, and Claim 8 was rejected under §103 in view of Cosman. Reconsideration and withdrawal of the rejections are respectfully requested.

#### Claims 1 and 17

Independent Claim 1 relates to acquisition of first three-dimensional surface data representing at least a portion of a patient's body while the patient is in a first position substantially maintained during a computed tomography scan, acquisition of second data independent from the first data and representing at least one internal three-dimensional portion of the patient's body while the patient is in the first position, determination of a location of an isocenter of the patient based on the second data, and conversion of the first three-dimensional

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surface data to a coordinate frame of the patient. The location of the isocenter of the patient is an origin of the coordinate frame of the patient. Claim 1 further concerns acquisition of third three-dimensional surface data representing at least the portion of the patient's body while the patient is in a second position substantially maintained in preparation for radiation treatment to be delivered by a radiation treatment station, conversion of the third three-dimensional surface data to a coordinate frame of the radiation treatment station, and determination of if the first position corresponds to the second position by directly comparing the converted first three-dimensional surface data to the converted third three-dimensional surface data. An isocenter of the radiation treatment station is an origin of the coordinate frame of the radiation treatment station.

Some embodiments of the foregoing features may provide efficient determination of whether a patient's position at a radiation treatment station corresponds to a position that was maintained during a computed tomography scan. Some embodiments may also reduce a need for coordinate frame transformations within a radiation treatment room.

The Office Action acknowledges that Cosman confirms the position of a radiation target relative to the position of a radiation beam by registering both positional data sets (i.e., a data set representing the target and a data set representing the LINAC) to the coordinate space of the camera system. (Final Office Action, page 3, para. b.) For example, and as previously described in detail, Cosman acquires camera data including positions of surface markers in camera space and transforms previously-acquired image scan data of surface markers and a target to the camera space based on positions of the surface markers in the camera data and the image scan data. The transformed image scan data is used to evaluate the target location in camera space with respect to a position of a LINAC isocenter in camera space.

In contrast, Claim 1 recites three-dimensional surface data converted to a coordinate frame of the patient, where the location of the isocenter of the patient is an origin of the coordinate frame of the patient, and third three-dimensional surface data in a coordinate frame of the radiation treatment station, where an isocenter of the radiation treatment station is an origin of the coordinate frame of the radiation treatment station. In further contrast, Claim 1 recites direct comparison of these sets of surface data which reflect different coordinate frames.

Claim 1 is therefore believed to be in condition for allowance. Claim 17 relates to a medium storing controller-executable process steps that roughly correspond to the method of

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Claim 1. Claim 17 is therefore also believed to be allowable for at least those reasons presented above with respect to Claim 1. Withdrawal of the rejections of Claims 1, 17 and their respective dependent claims is therefore respectfully requested.

#### Claim 12

Independent Claim 12 relates to a method including acquisition of computed tomography data of a patient while the patient remains substantially in a first position, acquisition of first three-dimensional surface data of the patient independent from the computed tomography data while the patient remains substantially in the first position, determination of a radiation treatment plan based on the computed tomography data, the three-dimensional data, and data representing a physical layout of a radiation treatment station, determination of a location of an isocenter of the patient based on the computed tomography data, and conversion of the first three-dimensional surface data to a coordinate frame of the patient. The location of the isocenter is the origin of the coordinate frame of the patient.

The method further includes acquisition of second three-dimensional surface data of the patient while the patient remains substantially in a second position at the radiation treatment station, conversion of the second three-dimensional surface data to a coordinate frame of the radiation treatment station, determination of whether the first position corresponds to the second position by directly comparing the converted first three-dimensional surface data to the converted second three-dimensional surface data, and delivery of radiation to the patient according to the radiation treatment plan if it is determined that the first position corresponds to the second position. The isocenter of the radiation treatment station is an origin of the coordinate frame of the radiation treatment station.

As stated above, Cosman is not seen to disclose or suggest at least conversion of first three-dimensional surface data of a patient in a first position to a coordinate frame of the patient, where the isocenter of the patient is an origin of the coordinate frame of the patient, conversion of second three-dimensional surface data of the patient in a second position at a radiation treatment station to a coordinate frame of the radiation treatment station, where the isocenter of the radiation treatment station is an origin of the coordinate frame of the radiation treatment station, and determination of whether the first position corresponds to the second position by

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directly comparing the converted first three-dimensional surface data to the converted second three-dimensional surface data.

Nowhere does Cosman disclose or suggest conversion of second three-dimensional surface data of a patient in a second position at a radiation treatment station to a coordinate frame of the radiation treatment station, where the isocenter of the radiation treatment station is an origin of the coordinate frame of the radiation treatment station, and direct comparison of the converted second three-dimensional surface data with first three-dimensional surface data in a coordinate frame of the patient, where a location of a patient isocenter is the origin of the coordinate frame of the patient.

Claim 12 is therefore believed to be in condition for allowance and withdrawal of the rejection thereof is respectfully requested.

#### Claim 13

Independent Claim 13 concerns a system which includes a computed tomography scanning device for acquiring computed tomography data of a patient while the patient is in a scanning position, a first surface photogrammetry device for acquiring first three-dimensional surface data independent from the computed tomography data of at least a portion of the patient's body while the patient is in the scanning position, and an operator station for determining a location of an isocenter of the patient based on the computed tomography data, and for converting the first three-dimensional surface data to a coordinate frame of the patient. The location of the isocenter is the origin of the coordinate frame of the patient.

The claimed system also includes a radiation treatment station for delivering radiation to the patient, a second surface photogrammetry device for acquiring second three-dimensional surface data of at least the portion of the patient's body while the patient is in a treatment position on the radiation treatment station, and a controller for converting the second three-dimensional surface data to a coordinate frame of the radiation treatment station, and for determining if the treatment position corresponds to the scanning position by directly comparing the converted first three-dimensional surface data to the converted second three-dimensional surface data. An isocenter of the radiation treatment station is the origin of the coordinate frame of the radiation treatment station.

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Applicants respectfully submit that Cosman fails to disclose or suggest conversion of second three-dimensional surface data of a patient in a second position at a radiation treatment station to a coordinate frame of the radiation treatment station, where the isocenter of the radiation treatment station is an origin of the coordinate frame of the radiation treatment station, and direct comparison of the converted second three-dimensional surface data with first three-dimensional surface data in a coordinate frame of the patient, where a location of a patient isocenter is the origin of the coordinate frame of the patient.

Claim 13 is therefore believed to be in condition for allowance, and withdrawal of the rejection thereof is respectfully requested.

### CONCLUSION

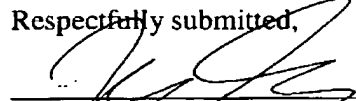
The outstanding Office Action presents a number of characterizations regarding each of the applied references, some of which are not directly addressed herein because they are not related to the rejections of the independent claims. Applicants do not necessarily agree with the characterizations and reserves the right to further discuss those characterizations.

For at least the reasons given above, it is submitted that the entire application is in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience. Alternatively, if there remains any question regarding the present application or any of the cited references, or if the Examiner has any further suggestions for expediting allowance of the present application, the Examiner is cordially requested to contact the undersigned.

PLEASE MAIL CORRESPONDENCE TO:

Siemens Corporation  
Customer No. 28524  
Attn: Elsa Keller, Legal Administrator  
170 Wood Avenue South  
Iselin, NJ 08830

Respectfully submitted,

  
Jenny G. Ko, Reg. No. 44,190  
Attorney for Applicants  
Telephone: (650) 694-5810  
Date: 2/19/08